

Miniaturized Airborne Instrument for N₂O, Phase I

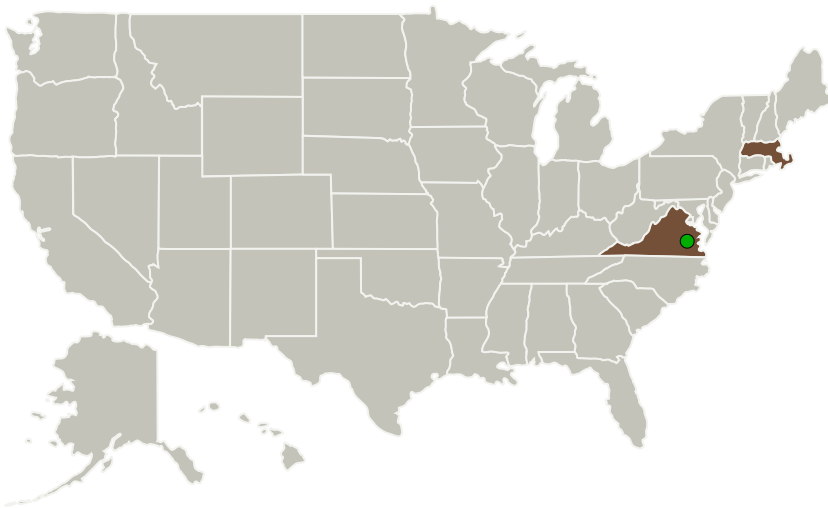
Completed Technology Project (2016 - 2016)



Project Introduction

Nitrous Oxide (N₂O) is an important greenhouse gas, as well as a tracer for stratospheric air mass. We propose to design a miniaturized N₂O detector based on direct absorption spectroscopy that is able to be deployed on SIERRA class and Global Hawk UAVs using many of the same functional elements as Aerodyne Research's commercial mini-QCL trace gas instruments. Achieving this will allow for better source attribution of N₂O as well as providing an important tool for understanding mixing processes between the troposphere and stratosphere. Specifically, our proposal calls for exploring two designs for a low-volume in-line multipass absorption cells; passive cooling of the laser and instrument electronics, a simplified low-power electronics design and computer, and low-power vacuum pump. The goal for Phase I will be the successful identification, design, and testing of components that can be integrated into a small UAV-compatible instrument packaged during Phase II.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Aerodyne Research, Inc	Lead Organization	Industry	Billerica, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

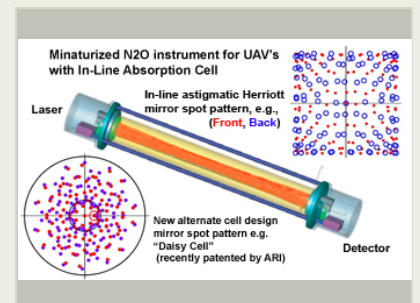
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Primary U.S. Work Locations

Massachusetts

Virginia

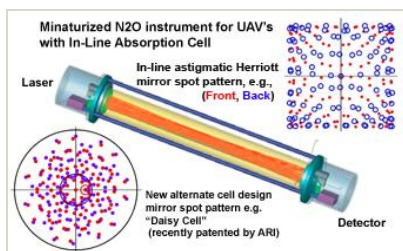
Project Transitions

**June 2016:** Project Start**December 2016:** Closed out

Closeout Documentation:

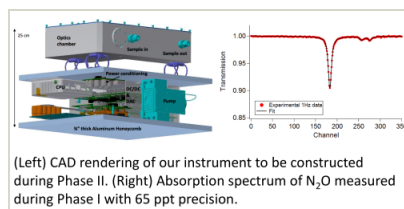
- Final Summary Chart(<https://techport.nasa.gov/file/139655>)

Images



Briefing Chart Image

Miniaturized Airborne Instrument for N₂O, Phase I
(<https://techport.nasa.gov/image/135991>)



Final Summary Chart Image

Miniaturized Airborne Instrument for N₂O, Phase I Project Image
(<https://techport.nasa.gov/image/131506>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Aerodyne Research, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

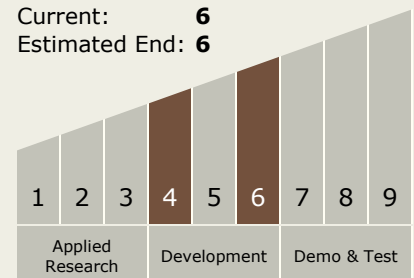
Carlos Torrez

Principal Investigator:

John B Mcmanus

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



Miniaturized Airborne Instrument for N2O, Phase I

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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System